IN THE CLAIMS:

The claims are as follows:

1. (Previously Presented) A neural transplantation device for use in combination with a syringe (3), including a syringe barrel (7) and plunger (12), comprising:

- a microinjector (1) adapted for connection to a proximal end of a syringe barrel (7) and in cooperation with the syringe plunger (12) for effecting incremental depression of the plunger (12); and

- a cannula (2) adapted for connection to a distal end of the syringe barrel (7), said cannula (2) having a single passageway with an open upper end and a lower end defining a blunt closed tip (14) and having a pair of side port holes (15A),(15B) that are diametrically opposed and slightly offset to each other near the vicinity of the cannula tip (14);

- whereby upon placement of the cannula (2) at a predetermined targeted neural site, the microinjector (1) is capable of effecting incremental depression of the plunger (12) to result in a metered delivery of the contents of the syringe barrel (7) through the cannula port holes (15A),(15B) at the targeted site.

2. (Currently Amended) ~~The neural transplantation device according to Claim 1, characterized in that the microinjector (1) comprises:~~ A neural transplantation device for use in combination with a syringe (3), including a syringe barrel (7) and plunger (12), comprising:

- a microinjector (1) adapted for connection to a proximal end of a syringe barrel (7) and in cooperation with the syringe plunger (12) for effecting incremental depression of the plunger

(12), said microinjector (1) comprising [[-]] a longitudinal hollow cylindrical sleeve (4) extending into a cylindrical barrel (5) of larger diameter at the distal end thereof, said sleeve (4) capable of receiving a syringe plunger (12), [[; -]] a guide nut (8) rotatably adjustable within the cylindrical barrel (5) and adapted to cooperate with the proximal end of the syringe barrel, (7)[[;]] and [[-]] a driver rotatably mounted near the proximal end of the cylindrical sleeve (4) and adapted to cooperate with the syringe plunger (12), [[; -]] whereby operation of the microinjector (1) in combination with the syringe (3) and the cannula (2) allows delivery of an injection such that rotation of the driver renders a downward axial force to the plunger (12) of the syringe (3) thereby aspirating contents of the syringe barrel (7) through the side port holes (15A),(15B) of the cannula (2); while rotation of the guide nut (8) in the opposite direction moves the syringe (3) in an upward axial direction to reposition the cannula (2); and rotation of the driver and the guide nut (8) in a repeated manner facilitates sequential delivery of multiple portions of the contents of the syringe barrel (7) along a single trajectory in a three-dimensional spiral array at a predetermined neural injection site[[.]]; and

- a cannula (2) adapted for connection to a distal end of the syringe barrel (7), said cannula (2) having a single passageway with an open upper end and a lower end defining a blunt closed tip (14) and having a pair of side port holes (15A),(15B) that are diametrically opposed and slightly offset to each other near the vicinity of the cannula tip (14);

- whereby upon placement of the cannula (2) at a predetermined targeted neural site, the microinjector (1) is capable of effecting incremental depression of the plunger (12) to result in a metered delivery of the contents of the syringe barrel (7) through the cannula port holes (15A),(15B) at the targeted site.

3. (Original) The neural transplantation device according to Claim 2, characterized in that the guide nut (8) is a small hollow cylindrical spool with a collar (9) at its extreme distal end that acts as a lower boundary stop to limit its position inside the cylindrical barrel (5) when fully wound inside.

4. (Previously Presented) The neural transplantation device according to Claim 2, characterized in that an exterior wall of the guide nut (8) and an interior wall of the cylindrical barrel (5), which receives the guide nut (8), are threaded such that rotation of the guide nut (8) relative to the cylindrical barrel (5) causes a corresponding linear, axial movement of the guide nut (8) through the cylindrical barrel (5).

5. (Previously Presented) The neural transplantation device according to Claim 2, characterized in that the driver comprises a plunger driver (11) and a drive nut (10).

6. (Original) The neural transplantation device according to Claim 5, characterized in that the plunger driver (11) is adapted to cooperate with the proximal end of the syringe plunger (12) and a distal end of the drive nut (10) is engaged with a proximal end of the plunger driver (11), such that rotation of either the drive nut (10) or plunger driver (11) causes a corresponding linear, axial movement of the drive nut (10), plunger driver (11), and syringe plunger (12).

7. (Previously Presented) The neural transplantation device according to Claim 5, characterized

in that an exterior wall of the longitudinal cylindrical sleeve (4) and an interior wall of the plunger driver (11) and the drive nut (10) are threaded such that rotation of either the plunger driver (11) or drive nut (10) relative to the cylindrical sleeve (4) causes a corresponding linear, axial movement of the plunger driver (11), drive nut (10), and the syringe plunger (12).

8. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the cannula (2) has a length sufficient to linearly penetrate and enter a host brain such that the pair of side port holes (15A),(15B) is concurrently positionable at a predetermined targeted site within the host brain.

9. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the cannula (2) has an outside diameter of about 0.8 mm.

10. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the side port holes (15A),(15B) are positioned such that the distances between a distal edge of a first (15B) and a second side port hole (15A) to the cannula tip (14) are about 1.0 mm and 3.0 mm, respectively.

11. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the diameters of the side port holes are the same.

12. (Previously Presented) The neural transplantation device according to Claim 1,

characterized in that the diameter of each side port hole (15A),(15B) is 0.3 mm.

13. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the microinjector (1) is manufactured from acetal nylon and ionized aluminum.

14. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the cannula (2) is manufactured from stainless steel.

15. (Previously Presented) A method of using a neural transplantation device defined according to Claim 2 for administering an injection, comprising the steps of:

- positioning the syringe plunger (12) in an initial upward position;
- positioning the syringe barrel (7) with attached guide nut (8) in an essentially unwound position inside the cylindrical barrel (5) of the sleeve (4) of the microinjector (1);
- rotating the driver to advance the syringe plunger (12) in a downward axial direction through the syringe barrel (7) thereby aspirating and depositing a portion of the contents of the syringe barrel (7) through the side port holes (15A),(15B) of the cannula (2);
- rotating the guide nut (8) to effectively withdraw the syringe (3) and cannula (2) in an upward axial direction at a predetermined distance away from a previous neural target site; and
- repeating steps involving rotating the driver to deliver a portion of the contents of the syringe barrel (7) and rotating the guide nut (8) to reposition the cannula (2), thereby resulting in sequential delivery of multiple portions of the contents of the syringe barrel (7) in a three-

dimensional spiral array per single trajectory at a predetermined neural target site.

16. (Previously Presented) The method according to Claim 15, characterized in that the driver comprises a plunger driver (11) and a drive nut (10).

17. (Original) The method according to Claim 16, characterized in that the plunger driver (11) is adapted to cooperate with the proximal end of the syringe plunger (12) and the distal end of the drive nut (10) is engaged with the proximal end of the plunger driver (11), such that rotation of either the drive nut (10) or plunger driver (11) causes a corresponding linear, axial movement of the drive nut (10), plunger driver (11), and syringe plunger (12).

18. (Previously Presented) The method according to Claim 16, characterized in that an exterior wall of the longitudinal cylindrical sleeve (4) and an interior wall of the plunger driver (11) and the drive nut (10) are threaded such that rotation of either the drive nut (10) or plunger driver (11) relative to the cylindrical sleeve (4) causes a corresponding linear, axial movement of the drive nut (10), plunger driver (11), and the syringe plunger (12).

19. (Previously Presented) A bullet guide (16) for use in combination with a stereotactic frame which functions as a mechanical guiding system for the neural transplantation cannula according to Claim 1, comprising:

- a top member (17) comprising a hollow cylindrical element having a closed end with an array of equidistantly spaced holes (19A) sized to accommodate the insertion of the cannula (2); and

- a bottom member (20) comprising a hollow cylindrical element of the same diameter as the top member (17) but having a longer longitudinal axis; said bottom member (20) being closed at both ends and each end having an array of equidistantly spaced holes (21A),(21B) sized to accommodate the insertion of the cannula (2);
- characterized in that the top member (17) and bottom member (20) are mounted in spaced coaxial alignment in the stereotactic frame with the respective arrays of holes (19A),(21A),(21B) in mutual alignment to guide deployment of the cannula (2) through an aligned set of said holes (19A),(21A),(21B) to a predetermined cerebral target.

20. (Previously Presented) The bullet guide (16) according to Claim 19, characterized in that the top member (17) and bottom member (20) are manufactured from acetal nylon.

21. (Previously Presented) The neural transplantation device according to Claim 3, characterized in that an exterior wall of the guide nut (8) and an interior wall of the cylindrical barrel (5), which receives the guide nut (8), are threaded such that rotation of the guide nut (8) relative to the cylindrical barrel (5) causes a corresponding linear, axial movement of the guide nut (8) through the cylindrical barrel (5).

22. (Previously Presented) The neural transplantation device according to Claim 21, characterized in that the driver comprises a plunger driver (11) and a drive nut (10).

23. (Previously Presented) The neural transplantation device according to Claim 22,

characterized in that an exterior wall of the longitudinal cylindrical sleeve (4) and an interior wall of the plunger driver (11) and the drive nut (10) are threaded such that rotation of either the plunger driver (11) or drive nut (10) relative to the cylindrical sleeve (4) causes a corresponding linear, axial movement of the plunger driver (11), drive nut (10), and the syringe plunger (12).

24. (Previously Presented) The neural transplantation device according to Claim 23 , characterized in that the cannula (2) has a length sufficient to linearly penetrate and enter a host brain such that the pair of side port holes (15A),(15B) is concurrently positionable at a predetermined targeted site within the host brain.

25. (Previously Presented) The neural transplantation device according to Claim 24, characterized in that the cannula (2) has an outside diameter of about 0.8 mm.

26. (Previously Presented) The neural transplantation device according to Claim 25, characterized in that the side port holes (15A),(15B) are positioned such that the distances between a distal edge of a first (15B) and a second side port hole (15A) to the cannula tip (14) are about 1.0 mm and 3.0 mm, respectively.

27. (Previously Presented) The neural transplantation device according to Claim 26, characterized in that the diameters of the side port holes are the same.

28. (Previously Presented) The neural transplantation device according to Claim 27,

characterized in that the diameter of each side port hole (15A),(15B) is 0.3 mm.

29. (Previously Presented) The neural transplantation device according to Claim 28, characterized in that the microinjector (1) is manufactured from acetal nylon and ionized aluminum.

30. (Previously Presented) The neural transplantation device according to Claim 29, characterized in that the cannula (2) is manufactured from stainless steel.

31. (Previously Presented) A method of using a neural transplantation device defined according to Claim 30, for administering an injection, comprising the steps of:

- positioning the syringe plunger (12) in an initial upward position;
- positioning the syringe barrel (7) with attached guide nut (8) in an essentially unwound position inside the cylindrical barrel (5) of the sleeve (4) of the microinjector (1);
- rotating the driver to advance the syringe plunger (12) in a downward axial direction through the syringe barrel (7) thereby aspirating and depositing a portion of the contents of the syringe barrel (7) through the side port holes (15A),(15B) of the cannula (2);
- rotating the guide nut (8) to effectively withdraw the syringe (3) and cannula (2) in an upward axial direction at a predetermined distance away from a previous neural target site; and
- repeating steps involving rotating the driver to deliver a portion of the contents of the syringe barrel (7) and rotating the guide nut (8) to reposition the cannula (2), thereby resulting in sequential delivery of multiple portions of the contents of the syringe barrel (7) in a three-

dimensional spiral array per single trajectory at a predetermined neural target site.

32. (Previously Presented) The method according to Claim 31, characterized in that an exterior wall of the longitudinal cylindrical sleeve (4) and an interior wall of the plunger driver (11) and the drive nut (10) are threaded such that rotation of either the drive nut (10) or plunger driver (11) relative to the cylindrical sleeve (4) causes a corresponding linear, axial movement of the drive nut (10), plunger driver (11), and the syringe plunger (12).

33. (Previously Presented) A bullet guide (16) for use in combination with a stereotactic frame which functions as a mechanical guiding system for the neural transplantation cannula according to Claim 30, comprising:

- a top member (17) comprising a hollow cylindrical element having a closed end with an array of equidistantly spaced holes (19A) sized to accommodate the insertion of the cannula (2); and
- a bottom member (20) comprising a hollow cylindrical element of the same diameter as the top member (17) but having a longer longitudinal axis; said bottom member (20) being closed at both ends and each end having an array of equidistantly spaced holes (21A),(21B) sized to accommodate the insertion of the cannula (2);
- characterized in that the top member (17) and bottom member (20) are mounted in spaced coaxial alignment in the stereotactic frame with the respective arrays of holes (19A),(21A),(21B) in mutual alignment to guide deployment of the cannula (2) through an aligned set of said holes (19A),(21A),(21B) to a predetermined cerebral target.

34. (Previously Presented) The neural transplantation device according to Claim 1, characterized in that the microinjector (1) comprises:

- a longitudinal hollow cylindrical sleeve (4) extending into a cylindrical barrel (5) of larger diameter at the distal end thereof, said sleeve (4) capable of receiving a syringe plunger (12);
- a guide nut (8) rotatably adjustable within the cylindrical barrel (5) and adapted to cooperate with the proximal end of the syringe barrel (7); and
- a driving means rotatably mounted near the proximal end of the cylindrical sleeve (4) and adapted to cooperate with the syringe plunger (12);
- whereby operation of the microinjector (1) in combination with the syringe (3) and the cannula (2) allows delivery of an injection such that rotation of the driving means renders a downward axial force to the plunger (12) of the syringe (3) thereby aspirating contents of the syringe barrel (7) through the side port holes (15A),(15B) of the cannula (2); while rotation of the guide nut (8) in the opposite direction moves the syringe (3) in an upward axial direction to reposition the cannula (2); and rotation of the driving means and the guide nut (8) in a repeated manner facilitates sequential delivery of multiple portions of the contents of the syringe barrel (7) along a single trajectory in a three-dimensional spiral array at a predetermined neural injection site.

35. (Previously Presented) The neural transplantation device according to Claim 2, characterized in that the driving means comprises a plunger driver (11) and a drive nut (10).

36. (Previously Presented) A method of using a neural transplantation device defined according to Claim 2 for administering an injection, comprising the steps of:

- positioning the syringe plunger (12) in an initial upward position;
- positioning the syringe barrel (7) with attached guide nut (8) in an essentially unwound position inside the cylindrical barrel (5) of the sleeve (4) of the microinjector (1);
- rotating the driving means to advance the syringe plunger (12) in a downward axial direction through the syringe barrel (7) thereby aspirating and depositing a portion of the contents of the syringe barrel (7) through the side port holes (15A),(15B) of the cannula (2);
- rotating the guide nut (8) to effectively withdraw the syringe (3) and cannula (2) in an upward axial direction at a predetermined distance away from a previous neural target site; and
- repeating steps involving rotating the driving means to deliver a portion of the contents of the syringe barrel (7) and rotating the guide nut (8) to reposition the cannula (2), thereby resulting in sequential delivery of multiple portions of the contents of the syringe barrel (7) in a three-dimensional spiral array per single trajectory at a predetermined neural target site.

37. (Previously Presented) The method according to Claim 36, characterized in that the driving means comprises a plunger driver (11) and a drive nut (10).